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"At Herschel I. we learned of the mistaken report sent via Hudson Bay Company's MacKenzie steamer regarding the loss of the ice party.

"I volunteered to try to reach some telegraph post in Alaska, whence a contradiction of the report could be despatched. I went to Fort MacPherson by boat, walked over the mountains for six days to reach Bell River, and floated down it alone to Fort Yukon, where I arrived on Sept. 3, twenty-seven days from Herschel Island. Dr. Howe and the crew probably will arrive in San Francisco in November."

GEOGRAPHICAL RECORD.

AFRICA.

VARIATIONS IN THE LEVEL OF LAKE CHAD.—*La Géographie,* for March, giving the results of the military studies during 1906 of the Lake Chad region, publishes notes obtained from the natives concerning variations of level in the lake. Two of the tribes assign a period of about twenty years as the limit of the ordinary small fluctuation of the lake. It seems probable from their statements that the total period may be divided roughly into five years of high water, five years of falling level, five years of low water, and five years of rise. Finally, at the end, apparently, of four or five twenty-year periods of fluctuation, there occurs an almost complete desiccation, which is followed by a great rise of level.

One old native remembered the last great drying up, which, on his evidence, is assigned to a period between 1828 and 1833; while nearly twenty years later, in 1851, the level was very high. The same native said that his grandfather told of an earlier desiccation which he had seen. During 1906 the lake was very low.

These notes seem to confirm the conclusions reached by Lieut. Boyd Alexander, who does not endorse the theory of the past few years that Lake Chad is now undergoing an exceptional period of desiccation. His view is that the present low stage of water is an ordinary phenomenon, the lake being subject to periodical changes of level.

PROF. HENRY FAIRFIELD OSBORN in his article, *Hunting the Ancestral Elephant in the Fayûm Desert* (The Century Magazine, October, 1907), presents a Map of the Region Explored by the Expedition of the American Museum. Of this map Mr. Cope Whitehouse speaks as follows (in a communication to the *New York Times Saturday Review of Books,* of October 5, p. 606):

> The map printed in the *Century Magazine* is copied from that of a Mr. Beadnell. Its abundant errors are easily detected by a comparison with the maps drawn by me, or the one revised by the British War Office under my personal supervision.

It is to be regretted that Prof. Osborn had not found time to study the BULLETIN of the Society, which Mr. Whitehouse presented to him before his departure on his expedition.

EAST AFRICA BETWEEN VICTORIA NYANZA AND KILIMANJARO.—The summary given in the *Geographical Journal* (July, 1907) of the characteristics of the region through which the Anglo-German Boundary Commission passed, gives notable information about the country along the boundary. It differs in no way from the usual African upland bush, whose characteristics vary but little in the altitudes from 1,500 to 5,000 feet above the sea. At altitudes greater than 6,000 feet, the vegetation assumes a more park-like character, such as one is accustomed to see in England. The density of forest growth depends upon rainfall or condensation, which varies according to the aspect of the slopes. These conditions include all the varieties of country in the region surveyed.

Looking at the map, we see that the country from Lake Jipé on the east gradually rises to the plains east and north of Kilimanjaro, culminating at a height of 19,318 feet in the highest point of the snow-covered crater edge of Kibo. From these plains the country gradually rises to Mount Erok, falling again through a very broken country full of countless successions of parallel (north and south) faults to the bottom of the great Rift Valley.

This is the lowest level reached by the survey, 2,000 feet at Lake Natron. The western escarpment of the Rift Valley rises from the shore of this lake to a height of over 7,000 feet in a single and almost vertical steep to the summit of Mount Sambu. The boundary line then rises to about 8,300 feet over a series of rugged spurs and deeply-cut, densely-wooded gorges. The park-like country at the summit gives way gradually, as the country falls, to the drier thorn bush of the Mara River plains. Then from the top of the Isuria escarpment, which, unlike the western side of the Rift Valley, rises as an almost unbroken barrier along its whole length, are the scattered clumps of bushes and long grass, giving way, as the country falls to the shore of Victoria Nyanza, to the thorn bush and yellow burned-up grass of the lower veld.

NO COAL IN NORTH AFRICA.—Up to the present time no deposit of coal has been discovered in the Sahara nor anywhere in North Africa. An attempt to ascertain whether coal really exists to the south of Algeria has been made by Mr. E. F. Gautier, and the results of his explorations have been communicated to the Société d'Encouragement (*Bulletin,* Vol. cix, No. 3) by Mr. A. Carnot. No trace of coal was found, but an extensive Carboniferous area was traversed between Figuig and In Salah, and it is possible that coal exists concealed beneath the vast Cretaceous plateaux.

MR. SAVAGE LANDOR ON THE CONGO.—This traveller, whose recent book on Tibet has been most favourably received, lectured before the Royal Institution of London on May 31 on his journey across Africa, during which he visited the Congo State. He asserted that excellent order reigns in the Belgian Congo. The natives are happy and well treated. The country, far from having been ravaged, has been considerably developed, thanks to the construction of roads, the establishment of large rubber plantations, and the extensive cultivation of rice, millet, Indian corn, etc. Most of the assertions regarding the treatment of the natives are grossly exaggerated, if not altogether unfounded. He especially praised the Italian officers in the service of the Congo Free State, who, he says, have accomplished a remarkable work in that country. He was able to bear witness that the natives everywhere, as a consequence of the kindness with which they have been treated, show much affection for these officers.

RAILROADS IN THE CONGO STATE.—Mr. D. C. Boulger, the well-known writer on Africa, has an excellent article on the railroads of the upper Congo in the *Engineering Magazine* (Vol. XXXIII, No. 4). It is a friendly estimate of Belgian enterprise and achievement in pushing the railroad across Africa from the west coast towards the great north and south artery of the Cape to Cairo line. Excellent photographs show the difficulty encountered in cutting the track through the dense forest.

WHEAT-GROWING IN EAST AFRICA.—The Department of Agriculture of British East Africa has published the results of experiments with several varieties of wheat, conducted at Nairobi on the high plateau of the interior both by the authorities and by settlers in the surrounding districts. Most of the experiments were unsuccessful owing to "rust," but a variety of wheat that appears to be well adapted to parts of the highlands has been obtained. The name of this variety is Glugas. It was introduced from South Australia. A large area in the highlands, particularly in the Njoro district, is apparently well suited for wheat-growing; and should further experiments this season prove successful, it is likely that another year will see the establishment of an extensive local wheat industry.

The Germans report, a little farther south in German East Africa, that important areas of the highlands are adapted for wheat-raising. In Mr. Fuchs' recent report to the German Colonial Industrial Committee, the photograph of a fine wheat field is shown. The high region of Ruanda, adjoining the Congo Free State, is said to be particularly adapted for wheat-growing. White settlers are not permitted to make homes in this region, as the natives are not yet entirely under control.

AMERICA.

CONCENTRATION OF GOLD IN THE KLONDIKE.—Mr. J. B. Tyrrell, the Canadian geologist, discusses in *Economic Geology* (June, 1907) the conditions in the Klondike gold-bearing district, where the origin and processes of deposition and concentration of the gold in its present position are quite easily recognized and interpreted. The more or less rectangular area of which his paper treats contains about 800 square miles. It is a well-defined physiographic unit, consisting of a mountain mass separated from surrounding mountains, except in the extreme southeast, by deep and wide valleys, from which the land rises in easy slopes to the highest point near the centre of the area. The country is largely underlain by schistose rocks, very old, probably Precambrian or Cambrian, and much folded and twisted. They have been greatly altered from the eruptives or sediments at first formed or deposited.

These schists are cut by many narrow veins, stringers, and lenses of gold-bearing quartz that seem to be present everywhere, although in no place sufficiently aggregated to pay for mining in themselves. They are, however, very important, as the gold collected in the placers of the valley bottoms was derived from them.

In some places around the margin of the district are outliers of Eocene sedimentary rocks. During that period the land seems to have been lowered so that the present 4,000 feet contour line was at or near the sea-level. About the close of the Eocene the land was lifted above the sea, and has not since been submerged, so that it has been subject for many ages to decomposition and erosion. In the course of this work the rain and streams cut out the valleys, dissolved parts of the rock, and washed the undissolved particles from the higher to lower levels. The grains and nuggets of gold, being very heavy, settled close to the places from which they were derived.

The processes of decomposition and erosion went on from age to age until the land was reduced almost to its present level. The bottoms of the valleys were filled with coarse pebbles and cobbles, mixed with which were the smaller but heavier nuggets and grains of gold that had been washed out of the same hills but, on account of their weight, were not carried away with the rock particles of the same size. These beds of quartzite gravel are known as the "white gravel" or "white quartz wash."

After these gravel beds were formed, the north-flowing streams were accelerated and acquired greater cutting power, probably by a tilting of the land; and these streams, therefore, cut narrower valleys, with steeper sides, through the white gravel and into the underlying rock. Terraces of the white gravel were left on one or both sides of the valleys, and the streams reconcentrated into their beds the gold from the gravel which they had cut through and washed away, and also any gold that may have been in the rock cut through below the older gravel.

These two sets of gravel deposits have together produced about 6,000,000 fine ounces of gold; and it is not improbable that there are still 4,000,000 ounces remaining in the placers.

THE RAILROAD OVER THE ANDES.—The road over the Andes which Chile and Argentina are building, and which is the last link in the line across South America between the Atlantic and Pacific, is nearing its completion. It is said that the entire line will be open to trade next year. The Andes section of the road begins at Mendoza in Argentina, crosses the Andes through a tunnel 4 kilometers long, and extends to the Chilean town, Los Andes, which has rail connection with the Pacific.

FARMING AND GRAZING POSSIBILITIES IN ARGENTINA.—According to the *Bulletin* of the Bureau of American Republics, when all the arable lands of Argentina shall be cultivated there will be 300,000,000 acres under the plough, leaving as many more to be utilized in the raising of sheep and cattle. It is estimated that 200,000,000 people will be able to live and thrive on the plains of that country.

RECONSTRUCTION OF VALPARAISO.—Late last year the Chilean Minister of the Interior promulgated a law providing for the reconstruction of the city of Valparaiso. New streets are accordingly being opened, and conduits for gas, water, and sewerage are being laid in accordance with modern sanitary methods.

CATALOGUE OF EARTHQUAKES ON THE PACIFIC COAST.—The Smithsonian Institution has just issued in its Miscellaneous Collections (No. 1721) a Catalogue of Earthquakes on the Pacific coast for the ten years 1897-1906. It was prepared by Prof. Alexander G. McAdie of the U. S. Weather Bureau, San Francisco, and is a continuation of the catalogue made by Professor Edward S. Holden and issued in 1898 in the Miscellaneous Collections, No. 1087. The list covers 64 pages. The larger part of the earth-movements were recorded only by seismographs. Descriptions at some length are given of the more important movements. The sources of information are the Records of the U. S. Weather Bureau, Lick Observatory, Students' Observatory at the University of California, the Observatory at Mare Island, and a manuscript list of earthquakes, compiled by Professor Harry Fielding Reid of Johns Hopkins University.

THE PILCOMAYO RIVER.—This river has its source in the Bolivian mountain ranges, and traverses the virgin forests of the Gran Chaco in a general southeasterly direction. For very many years the idea of utilizing the river for navigation has engaged the attention of the Argentine, Bolivian, and Paraguayan Governments and of private explorers, but without satisfactory results. A syndicate of capitalists decided in June, 1905, to send an expedition to study the navigable conditions of the river from its discharge into the Paraguay River to the colony of Buena Ventura, near parallel 22. The command of the expedition was offered to Civil Engineer Gunnar Lange, and his report (referred to in the September BULLETIN) has been translated into English and issued from the press of the Argentine Meteorological Office. It is accompanied by a map in seven sheets on a scale of 1.5 statute mile to an inch.

The expedition occupied four months. It numbered twenty-nine men, including the chief, two assistants, and a land-and-forest expert. A number of Indian tribes inhabit the country. None of them appear formidable or especially unfriendly. Many of them worked for the explorers, but the Tobas who killed Crevaux in 1882 worked only when they were paid in cotton shirts. An Argentine colony has been established at Buena Ventura, about 560 miles up the river. It contains about thirty families of colonists besides servants, intruders and squatters, bringing the total population up to about 1,000. Here is a brief summary of the conclusions reached as to the Pilcomayo and its navigability:

The river is navigable for the greater part of the year as far as Junta Fontana, for boats of not more than 1 meter draft.

The general inclines are favourable. It would not be very costly to clear the river of the numerous stumps and roots, and the serious want of water in times of drought might be remedied by the adoption of the series of locks and movable dams. A difficulty is presented by the sudden and very close turns of the river. This could be surmounted by cutting through the most pronounced bends.

From Junta Dorada to where the river leaves Bolivia there is no continuous navigation, but only interrupted streams, which disperse the water through a long series of swamps. Navigable canals with fourteen locks would have to be constructed above Junta Dorada, a distance of 135 kilometers.

It would be necessary to canalize the upper Pilcomayo with twenty-six locks, a distance of 228 kilometers. These improvements would secure throughout the whole year the depth of water required for uninterrupted navigation. The total cost is estimated at $5,000,000.

THE PARANÁ RIVER.—The Commissão Geographica e Geologica do Estado de S. Paulo, continuing its hydrographic studies in that State, has now issued a monograph describing the results of the survey of that part of the Paraná River forming the State's western boundary. The chief result is the map on a scale 1:50,000, or 0.7 statute mile to an inch, which is large enough for a detailed delineation. The map is in eight sheets, some of which contain cross sections of the river. Many fine photographs of the stream, shores, and waterfalls are also given.

ASIA.

EDUCATIONAL REFORM IN CHINA.—Mr. E. T. Williams, Chinese Secretary of the American Legation at Peking, has sent a report on this subject, which is printed in the Report, just issued, of the Commissioner of Education (Vol. 1, 1905). It traces the history of the school-reform movement in China, indicates the phases it has now assumed, and is, in fact, a valuable study in the development of human institutions. In September, 1901, the Government took steps to establish a general system of public schools on modern lines. A complete and detailed plan for a national system of public schools, beginning with the kindergarten and crowned by the Imperial University, was approved by the Emperor and Dowager Empress on Jan. 13, 1904, and local authorities were directed to carry it into operation. These authorities found themselves hampered by their ignorance of the modern curriculum, by the lack of properly-qualified teachers, and by the want of suitable text-books. The teachers are being secured in part from students in the mission schools, and by the employment of a few Europeans and Americans, but chiefly by the appointment of Japanese instructors.

The preparation of native teachers is being hastened by sending large numbers of students abroad for education. These students are supported by the Imperial Government or the various provincial authorities, and most of them have been sent to Japan, where thousands of them are in the schools. Text-books are being supplied in part by translations or original works prepared by missionaries or the various bureaux of translation which are now maintained by several of the provincial governments. These books, however, are to be subjected to revision, and new works are being prepared under Government supervision. The new school system has now been established in every province of China proper and bids fair to make rapid development in the near future. In Peking there are over forty schools of all grades and in the province of Chihli more than 3,000 schools. One serious defect is that no provision has been made for the education of girls, except in the kindergarten. By Imperial edict in December, 1905, the Board of Education was organized to have general control of the new school system.

WEST CHINA MISSION M. E. CHURCH, J. F. PEAT, *Presiding Elder.*—

CHUNGKING, WEST CHINA, Aug. 21, 1907.

Ed. Bulletin American Geog. Society.

DEAR SIR:—A late experience of mine may be of interest to those of your readers who may be travellers, or to those who appreciate a nice practical problem.

On the evening of Aug. 15, 1907, with an assistant to count seconds, I located my position by the following methods: I had as an outfit a good watch, but the time not accurately known, an eight-inch sextant, and an artificial horizon, current nautical almanac, and a book of tables. I first made observations on stars east and west (Altair and Arcturus) for my sidereal time, then I observed the moon's altitude from which I worked out her R. A. and thence the G. M. T. I then observed a south star (ϵ Sagittarius) near the meridian, and Polaris for my latitude. In all I took 37 observations in one hour and twelve minutes. I found that my latitude is 29° 31′ 45″ N. and my longitude is 7 h. 10 m. 48 s. E. G. My latitude must be right to within ten seconds, and as Chungking is given, on the best authority to date, as 7 h. 6 m., and as we are about two miles east of the city it seems unlikely that my longitude is more than three miles in error. Observations with the moon in other positions would tend to eliminate this error.

I call your attention to this method of locating a position because I know of no work that advocates it except Raper, who discounts it as a method to be used at sea, and says nothing of its use on land. It is a possible method for the traveller for two-thirds of the month, whereas good occultations are very rare; Lunar culminations require a theodolite and Lunar distances two sextants and observers.

My mean altitudes and mean times by watch of observations are as follows:

Valley View, Aug. 15, 1907.

Latitude about 29° 32′ N. Longitude about 7h. 10m.

Altair ½	observed angle	52°	7′	55.″5	Time	17h.	28m.	52.4s.
Arcturus ½ "	"	38°	39′	16.″5	"	17h.	52m.	48.5s.
Moon's lower limb	"	26°	32′	18″	"	17h.	43m.	8.5s.
Sag.	"	26°	1′	15″	"	18h.	15m.	23s.
Polaris	"	29°	13′	24″	"	18h.	22m.	58s.

I am, sincerely yours,

J. F. PEAT.

NEW MAPS.

AFRICA.

BRITISH EAST AFRICA-GERMAN EAST AFRICA.—Map of the Country North and South of the Anglo-German Boundary. Reduced from the Surveys of the British and German Commission during 1904–06. Scale, 1:500,000, or 7.89 statute miles to an inch. *Geog. Jour.*, July, 1907, London.

The map is a reduction from the topographic survey which was made on a scale of 1:100,000. The country on the British side of the boundary was surveyed by the British, that on the German side by the German section of the Commission. The map is based on a single series of triangles, and the heights are all trigonometrical.

CAPE OF GOOD HOPE.—Lieut. Elliot's expedition in N. W. Cape Colony. Scale, 40 statute miles to an inch. *Scot. Geog. Mag.*, August, 1907, Edinburgh.

Shows Elliot's route through the Karroo in the northwestern part of Cape Colony. The map makes some additions to the topographic delineation of this region.

CAPE OF GOOD HOPE.—Cape Colony, Reconnaissance Series. Sheets, 127–E (Orange River Mouth); 127–F (Stinkfontein); 127–K and L (Port Nolloth and O'Okiep), and 128–R (Britstown). Scale, 1:250,000, or 3.95 statute miles to an inch. Cape Colony Survey, Edward Stanford, Agent, London, 1907. (Price, 2s. per sheet.)

The work is based on the geodetic triangulation, and the surveys are being carried out by plane tabling. The method of the whole is similar to that employed by the U. S. Geological Survey in the west of the United States. The large amount of topographic and cultural information is very clearly expressed. The quality of the roads, the amount of water supply, the forest areas, wells, marsh, shrub, fords, etc., are shown.

GERMAN EAST AFRICA.—Das Untere Pangani Tal. Trigonometrisch und polygonometrisch aufgenommen, berechnet und gezeichnet, 1901–06 (mit Unterbrech-